TECHNICAL REPORT TITLE PAGE

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Evaluation of Lightweight Profilers for Construction Smoothness Evaluation

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5. AUTHOR(S)

Kevin B. Jones
Testing Engineer

Jason Omundson
Special Investigations Engineer

6. PERFORMING ORGANIZATION ADDRESS

Iowa Department of Transportation
Office of Materials
800 Lincoln Way
Ames, Iowa 50010

7. ACKNOWLEDGMENT OF COOPERATING ORGANIZATIONS/INDIVIDUALS

8. ABSTRACT

High-speed non-contact laser profilers have become the standard testing equipment for pavement management ride quality testing. The same technology used in the high-speed profilers is now being used in lightweight profilers for construction smoothness testing. The lightweight profilers have many advantages over the California 25-foot profilograph. Despite the many advantages of the lightweight profilers, there is resistance from the contracting industry toward eliminating the 25-foot profilograph for construction ride testing. One way to reduce or overcome the resistance is to evaluate and demonstrate the advantages/disadvantages of the lightweight profiler in actual field use in Iowa.

The Objective of the study was to purchase a lightweight profiler and to evaluate its suitability for construction smoothness quality verification and quality acceptance on Iowa projects. A lightweight profiler, an Ames Engineering, Inc. LISA single laser unit, was received in February 2003 for the study. Based on the work done during the 2003 construction season, the following conclusions can be made:

1. For HMA surfaces, the LISA correlated well with the contractors' profilographs.

2. LISA results are significantly affected by longitudinal tining on PCC Pavements. Without improvements to the hardware and software, LISA as well as the ICC high-speed profiler will not give accurate results. A laser system upgrade is needed.

3. A significant timesaving was realized by using the LISA. The larger the project, the more the timesavings. The portability of the LISA allowed the District to test a number of locations within a project and to test more than the minimum 10% when the situation warranted.

4. Increasing visibility and reducing time in the construction zone improved safety.

5. Much less physical ability was needed to use the LISA. One person with limited lifting capabilities could set up and operate the unit.

6. With the current Iowa DOT specification, the LISA cannot totally replace the profilograph. Bridges and short segments with no adjoining pavement would still require a profilograph.

9. KEY WORDS

Profilograph
Lightweight profiler
Pavement smoothness

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